

We claim:

1. A transgenic plant comprising a genetic construct wherein said construct comprises:
  - (a) a promoter, wherein said promoter is operatively linked to
  - (b) a nucleic acid sequence encoding a plant Hsp100 family amino acid sequence.
2. The transgenic plant of Claim 1 wherein said plant Hsp100 family amino acid sequence is selected from the group consisting of SEQ ID NO:1, SEQ ID NO:2, SEQ ID NO:3, SEQ ID NO:4, SEQ ID NO:5, SEQ ID NO:6, SEQ ID NO:7, SEQ ID NO:8, SEQ ID NO:17, SEQ ID NO:18, SEQ ID NO:19, SEQ ID NO:20, SEQ ID NO:21, SEQ ID NO:22, SEQ ID NO:23, SEQ ID NO:24, SEQ ID NO:25, SEQ ID NO:26, SEQ ID NO:27, SEQ ID NO:28, and SEQ ID NO:29.
3. The transgenic plant of Claim 1 wherein said nucleic acid sequence encoding said plant Hsp100 family amino acid sequence is endogenous to said transgenic plant.
4. The transgenic plant of Claim 1 wherein said nucleic acid sequence has sequence similarity with a sequence selected from the group consisting of SEQ ID NO:9, SEQ ID NO:10, SEQ ID NO:11, SEQ ID NO:12, SEQ ID NO:13, SEQ ID NO:14, SEQ ID NO:15, SEQ ID NO:16, SEQ ID NO:30, SEQ ID NO:31, SEQ ID NO:32, SEQ ID NO:33, SEQ ID NO:34, SEQ ID NO:35, SEQ ID NO:36, SEQ ID NO:37, SEQ ID NO:38, SEQ ID NO:39, SEQ ID NO:40, SEQ ID NO:41, SEQ ID NO:42, SEQ ID NO:43, SEQ ID NO:44, SEQ ID NO:45, SEQ ID NO:46, SEQ ID NO:47, SEQ ID NO:48, and SEQ ID NO:49.
5. The transgenic plant of Claim 1 wherein said transgenic plant is selected from the group consisting of a cereal, a grass, an ornamental plant, a crop plant, a food plant, an oil-producing plant, a synthetic product-producing plant, an environmental waste absorbing plant, an alcohol plant, a medicinal plant, a recreational plant, and an animal feed plant.
6. The transgenic plant of Claim 1 wherein said plant is selected from the group consisting of cotton, canola, soybean, corn, wheat, tobacco, sorghum, potato, tomato and *Arabidopsis thaliana*.
7. The transgenic plant of Claim 1 wherein said promoter is selected from the group consisting of a constitutive promoter and an inducible promoter.

8. The constitutive promoter of Claim 7 wherein said promoter is selected from the group consisting of a 35S cauliflower mosaic virus promoter, a CaMV-35S omega promoter, an *Arabidopsis* ubiquitin UBQ1 promoter, and a barley leaf thionin BTH6 promoter.
9. The constitutive promoter of Claim 8 wherein said promoter is a 35S cauliflower mosaic virus promoter
10. The inducible promoter of Claim 7 wherein said promoter is heat inducible.
11. The heat inducible promoter of Claim 10 wherein said promoter is selected from the group consisting of a heat shock protein promoter, a heat shock transcription factor promoter, a chaperonin promoter, an A1494 promoter, a rice genomic metallothionein-like gene (rgMT) promoter, a ubiquitin promoter, an FLP promoter, an *Oryza sativa* metallothionein like gene-2 (OsMT-2) promoter, a Glycine max *STII* (*gmsti*) promoter, a synthetic heat shock promoter and a *TCH* gene promoter.
12. A method of increasing stress tolerance of a plant comprising the steps of:
- preparing a transgenic plant comprising a genetic construct wherein said construct comprises a promoter, wherein said promoter is operatively linked to a nucleic acid sequence encoding a plant Hsp100 family amino acid sequence; and
- exposing said transgenic plant to a heat pretreatment.
13. The method of Claim 12, wherein said stress tolerance is thermotolerance.
14. The method of Claim 12 wherein said plant is a seedling.
15. A method of producing a crop comprising the steps of:
- preparing a transgenic plant in accordance with Claim 1, wherein said transgenic plant is a crop plant;
- growing said transgenic crop plant in an environment which produces heat stress; and
- extracting the crop from said transgenic crop plant.
16. The method of Claim 15 wherein said crop plant is selected from the group consisting of cotton, tobacco, corn, sorghum, rice, wheat, peanut, soybean, potato, tomato and canola.

17. A method of producing oil from a plant comprising the steps of:

preparing a transgenic plant in accordance with Claim 1, wherein said transgenic plant is an oil-producing plant;

growing said transgenic oil-producing plant in an environment which produces heat stress; and

extracting the oil from said transgenic oil-producing plant.

18. The method according to Claim 17 wherein said oil-producing plant is selected from the group consisting of canola, corn, peanut, olive, cotton and soybean.

19. A method of making a synthetic product from a plant comprising the steps of:

preparing a transgenic plant in accordance with Claim 1, wherein said transgenic plant is a synthetic product-producing plant;

growing said synthetic product-producing plant in an environment which produces heat stress; and

preparing the synthetic product from said synthetic product-producing plant.

20. A method of making an environmental waste absorbing plant comprising the steps of:

preparing a transgenic plant in accordance with Claim 1, wherein said transgenic plant is an environmental waste absorbing plant;

growing said environmental waste absorbing plant in an environment which produces heat stress; and

removing said environmental waste from said environment.

21. A method of making a medicinal plant comprising the steps of :

preparing a transgenic plant in accordance with Claim 1, wherein said transgenic plant is a medicinal plant;

growing said medicinal plant in an environment which produces heat stress; and

preparing a medicament from said medicinal plant.

22. A method of making animal feed from a plant comprising the steps of:

preparing a transgenic plant in accordance with Claim 1, wherein said transgenic plant is an animal feed-producing plant;

growing said animal feed-producing plant in an environment which produces heat stress; and

preparing the animal feed from said animal feed-producing plant.

23. The method of Claim 22 wherein said plant is selected from the group consisting of sorghum, soybean, wheat and corn.

24. A method of making alcohol from a plant comprising the steps of

preparing a transgenic plant in accordance with Claim 1, wherein said transgenic plant is an alcohol plant;

growing said alcohol plant in an environment which produces heat stress; and

preparing said alcohol from said alcohol plant.

25. A method of utilizing a recreational plant comprising the steps of:

preparing a transgenic plant in accordance with Claim 1, wherein said transgenic plant is a recreational plant;

growing said plant in an environment which produces heat stress; and

utilizing said plant for recreational purposes.

26. The method of Claim 25 wherein said plant is a grass.

27. As a composition of matter, a seed from a transgenic plant of claim 1.

28. As a composition of matter, a seed from a transgenic plant of claim 2.